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PHYTOTOXICOLOGY ASSESSMENT SURVEY
OF METAL CONCENTRATIONS
IN SURFACE SOIL
IN THE VICINITY OF
BURNSTEIN CASTINGS,
CATHERINE STREET, ST. CATHARINES
MARCH, 1988

DECEMBER 1988



Environment
Ontario

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Minister

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**Phytotoxicology Assessment Survey
of Metal Concentrations in Surface Soil in the
Vicinity of Burnstein Castings, Catherine Street,
St. Catharines - March, 1988**

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Résumé

À six des neuf points d'échantillonnage, nous avons détecté une teneur élevée en cuivre (> 100 ppm) à la surface du sol (entre 0 et 2 cm); les concentrations d'autres métaux, y compris le plomb, étaient normales par rapport à la limite supérieure établie par la Section de phytotoxicologie pour les régions urbaines, à une profondeur de 0 à 5 cm. Les sites dont le sol avait une teneur élevée en cuivre seront de nouveau échantillonnés en 1988, car il a été impossible de le faire antérieurement à la profondeur normale de 5 cm parce que le sol était gelé. Une analyse de la végétation sera également faite en 1988.

**Phytotoxicology Assessment Survey of Metal Concentrations in Surface
Soil in the Vicinity of Burnstein Castings, Catherine Street,
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Introduction

On March 3, 1988 a soil sampling program was conducted by the Phytotoxicology Section in the vicinity of Burnstein Castings, Catherine Street, St. Catharines, at the request of Mr. B. Slattery, MOE, Welland. The sampling was conducted shortly following a public meeting at which area residents expressed concern that emissions from the Burnstein plant may be contaminating area properties. Lead was identified as a contaminant of concern.

Sampling Program

On March 3, a total of nine soil sites were sampled in the vicinity of the Burnstein plant, including two school properties (Sites 1 & 2), a public park (Site 3), a senior's residence (Site 4), and a community center (Site 5). Boulevards (Sites 6-9) of neighbouring residential properties also were sampled. School Site 1 was situated immediately W of Burnstein Castings, with school Site 2 being slightly more remote to the SSE. Park Site 3 was immediately E, while soil collection Sites 4 through 8, which included the seniors' residence property (Site 4) and the community center property (Site 5), were situated to the NE, N and NW of the company. Boulevard Site 9, located to the SSW, was the most remote of the 9 sites sampled (see attached map).

Duplicate lawn soil samples from the 0-2 cm depth were collected at all sampling sites using a metal soil corer. Surface soil is normally collected to a 5 cm depth; however, as the ground at all sites was frozen below 2 cm, only shallow 0-2 cm soil cores could be sampled.

The soil samples were processed in the Phytotoxicology laboratory and were submitted to the MOE Laboratory Services Branch to be analyzed for lead and several other metals (cadmium, chromium, cobalt, copper, iron, manganese, molybdenum, nickel, vanadium and zinc).

Results

In the attached table, the metal levels detected in the 0-2 cm soil cores collected at each site are compared to the Phytotoxicology Section Upper Limit of Normal guidelines for urban surface soil (0-5 cm). While this comparison does serve to provide some indication of the degree of soil contamination, it must be emphasized that the sampling of the 0-2 cm horizon would tend to yield higher results than would be expected from the normal 0-5 cm depth on which the guidelines have been developed.

At all sites, with the exception of copper, soil metal levels were found to be well within the normal range for urban surface soil (0-5 cm). Soil concentrations of copper at 6 of the 9 sampling sites were elevated in relation to the respective soil guideline (100 ppm). The highest copper levels in soil (0-2 cm) were detected in the yard at the rear of the Community Center building (Site 5 - 985 ppm) and in the boulevard which was sampled just west of the senior's residence (Site 4 - 705 ppm). As elevated (> 100 ppm) copper levels were found only at sites in the immediate vicinity of Burnstein Castings, with lower levels at more remote sites (Sites 9 and 2) it would appear that emissions from the Burnstein plant were responsible for the elevated soil-copper levels found in the localized survey area.

Summary

In summary, elevated soil copper levels (> 100 ppm) were detected at 6 of the 9 sampling sites in the immediate vicinity of Burnstein Castings, with the highest levels being detected on properties to the neighbouring N to NE (generally downwind) of the company. Soil levels of all other metals, including lead, were found to be well within a normal range when compared to the Phytotoxicology Section Upper Limit of Normal guidelines for urban surface soil (0-5 cm).

As it was not possible (due to frozen soil conditions) in March to collect soil at any of the sites at the standard sampling depth of 5 cm, on which the guidelines are based, all sites with an elevated copper level will be re-sampled at the standard depth (0-5 cm) during the early spring of 1988. A vegetation assessment survey also will be conducted later in 1988 to determine the current status of metal emissions from the Burnstein Castings plant.

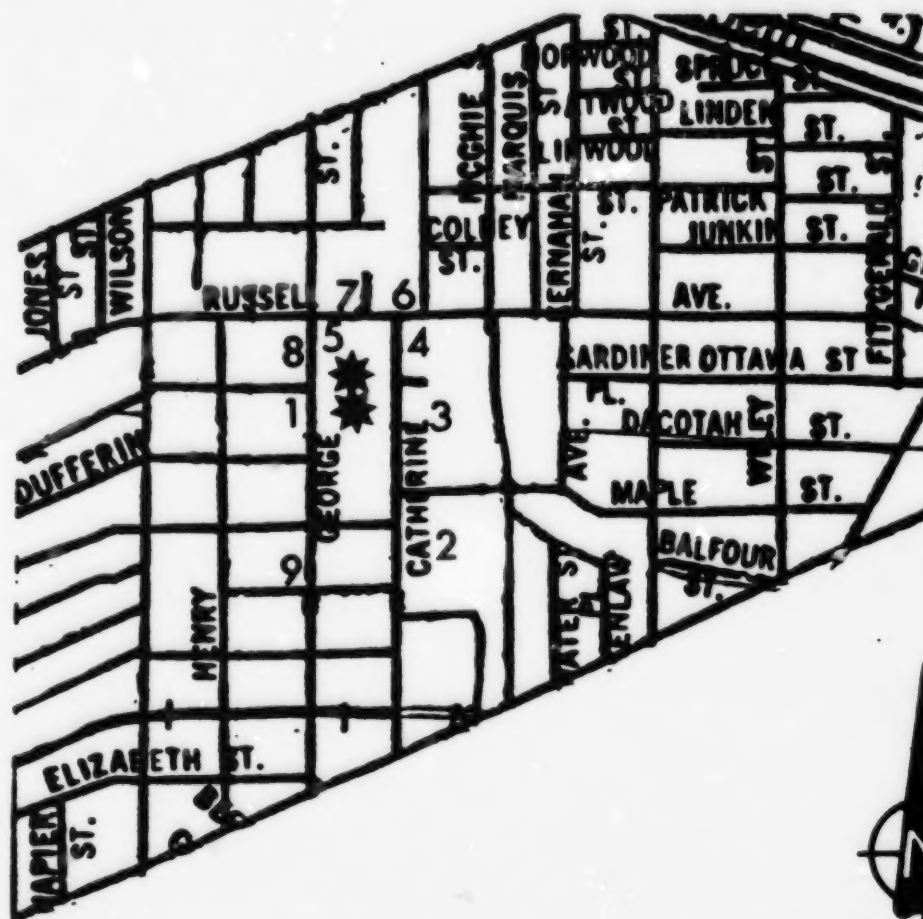
RE2390

Soil Metal Concentrations Detected in the Vicinity of Burnstein Castings (BC), Catherine Street
St. Catharines - March 3, 1988

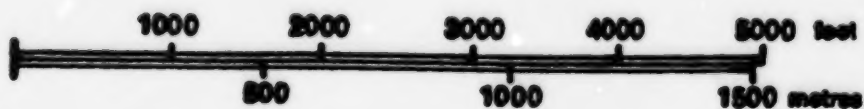
Site No.	Location/Area Sampled	Average* Concentration in Surface Soil (0-2 cm) - parts per million, dry wt. basis										
		Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Molybdenum	Nickel	Vanadium	Zinc
1	School Property Playfield (W of BC): - M limit (goal post area) - S limit (goal post area) - E limit (S of ball diamond) - W limit (beside slides etc.)	0.3	13	6	140	9,650	37	350	<1	9	18	89
		0.2	12	7	50	10,500	41	265	<1	10	20	125
		0.3	16	6	460	10,500	74	230	<1	15	20	150
		0.3	14	7	63	12,000	46	310	<1	11	22	69
2	School Property Playfield (SE of BC): - M limit (outside track) - Center (inside track) - S limit (outside track) Front yard (W of entrance off Catherine St.)	0.2	14	8	28	11,500	59	305	<1	13	28	94
		0.2	16	8	12	14,000	16	325	<1	13	26	41
		0.3	13	8	17	11,000	52	305	<1	12	22	62
		1.1	22	8	78	13,000	175	460	<1	15	26	215
3	Area of Public Park (E of BC) - Center of Park - Boulevard (E of Catherine St.)	0.3	13	7	48	12,000	30	330	<1	9	23	58
		0.5	19	8	125	13,000	89	350	<1	18	23	125
4	Senior Citizen's Residence (NE of BC) - yard W of Residence - Boulevard (E of Catherine St.)	0.4	14	6	220	10,500	34	350	<1	13	20	59
		0.5	28	7	705	11,500	94	385	<1	43	20	145
5	Community Center Property (W of BC) - yard S of Building	0.6	27	9	985	15,500	74	305	1.2	29	26	120
6	Boulevard W of Russell Ave. (NE of BC)	0.7	22	7	295	13,500	90	500	<1	22	20	170
7	Boulevard W of Russell Ave. (W of BC)	0.4	19	7	69	10,500	54	315	<1	15	19	94
8	Boulevard W of George St. (NE-W of BC)	0.7	23	8	655	14,000	170	430	<1	23	24	215
9	Boulevard W of George St. (SSW of BC)	0.8	18	8	64	15,000	180	555	<1	14	27	145
Phytotoxicology Section Upper Limit of Normal Guidelines for Urban Soil (0-5 cm)		4	50	25	100	35,000	500	700	3	60	70	500

*Based on duplicate sample results. All values underlined exceed the respective Upper Limit of Normal soil guideline.
RE2390-1

Soil Sites Sampled in The Vicinity of Burnstein Castings - March 3, 1988.



LEGEND



Burnstein Castings